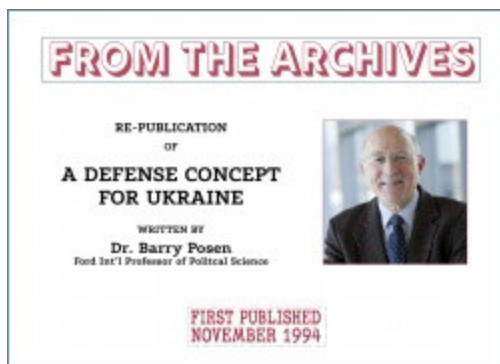




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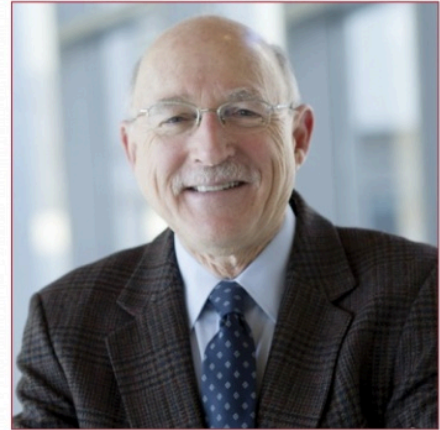
Barry Posen's 1994 defense concept for Ukraine



FROM THE ARCHIVES

RE-PUBLICATION
OF
**A DEFENSE CONCEPT
FOR UKRAINE**

WRITTEN BY
Dr. Barry Posen
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In 1994, SSP professor Barry Posen published "A Defense Concept for Ukraine" in the Russian language journal *Ukraine: Issues of Security*.

Today, for the first time, Dr. Posen and SSP are publishing that plan in English. Given the ongoing war in Ukraine, and the apparent sturdiness of Ukrainian defense forces, it is a timely piece of analysis from the twilight of the Cold War.

An excerpt from the first section of the essay reads:

"I will argue that Ukraine can address most of its plausible threat scenarios, with modest effectiveness, through a military strategy that could be termed a 'strategic defense in depth.' This strategy cannot hope actually to hold all of Ukraine against all challenges, but it can pose an impressive array of probable costs and plausible risks to a future aggressor. If properly organized, Ukrainian forces should be able to fight a tough delaying action in the eastern half of the country.

Ukrainian forces should then be able to mount a positional defense of the other half of the country, west of the Dnipro, against a very strong attack. This defense could impose very high costs on an attacker, though it too would ultimately fail if Ukrainian forces cannot produce or, more realistically, receive as military aid, the fuel, replacement weaponry, and munitions necessary to sustain modern warfare."

The full, downloadable article PDF, is available here:

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"A Defense Concept for Ukraine"

Ukraine is the second largest state to emerge from the wreckage of the Soviet Union. It possesses sufficient population, industry, and raw materials to aspire to independent middle-power status. Its geographical position and its military and civilian nuclear inheritance make its future security policy an important subject for all who are concerned about the political stability of Western and Central Europe. Ukraine is committed to enter the nuclear non proliferation treaty as a non-nuclear weapons state, which will remove nuclear deterrence as a strategic option. This essay thus examines the prospects for a non- nuclear defense concept and military organization for Ukraine. Can the state devise a potent conventional deterrent? No effort will be made to predict the specific political events that might ultimately produce an actual military threat to Ukraine. Rather, the purpose is to discover whether one can devise a concept and accompanying force posture that is sufficiently tough and flexible to help the state cope with a range of plausible problems.

Plan of the essay

First I broadly lay out the Ukrainian strategic situation, including the military geography of the country. Then the country's diplomatic situation is reviewed. The potential military capability and objectives of the most demanding potential adversary — Russia — are then discussed. Ukraine's potential military assets are also reviewed. I then develop the alternative military strategies available to Russia and to Ukraine, and assess their relative merits.

Briefly, I will argue that Ukraine can address most of its plausible threat scenarios, with modest effectiveness, through a military strategy that could be termed a "strategic defense in depth." This strategy cannot hope actually to hold all of Ukraine against all challenges, but it can pose an impressive array of probable costs and plausible risks to a future aggressor. If properly organized, Ukrainian forces should be able to fight a tough delaying action in the eastern half of the country.

Ukrainian forces should then be able to mount a positional defense of the other half of the country, west of the Dnipro, against a very strong attack. This defense could impose very high costs on an attacker, though it too would ultimately fail if Ukrainian forces cannot produce or, more realistically, receive as military aid, the fuel, replacement weaponry, and munitions necessary to sustain modern warfare. Ukrainians might wish for something better than this, but for reasons that will become clear, it will be very difficult for them to achieve a high-confidence conventional defense of most of their territory. If the broad brush plan I propose seems plausible, it would be reasonable for interested parties to explore its strengths and weaknesses more thoroughly through war games and simulations.

The Threat

The greatest threat faced by Ukraine is aggressive action by Russia, its most powerful neighbor.^[1] There is a good deal of evidence that many Russians view an independent Ukraine as artificial and temporary. While 72%, of Ukraine's 52 million citizens are of Ukrainian extraction (37.4 million), 22% of Ukrainian citizens, 11.4 million people, are of Russian extraction. Many of the latter live quite close to the eastern border with Russia. Russians in Crimea have expressed a desire to rejoin the motherland. Russians in the Donbass are restless. Russia has roughly three times the population and probably more than three times the economic potential of Ukraine.

Estimating crudely, Russia inherited more than half of the Soviet Union's military capabilities; Ukraine inherited perhaps 15% of the ground and tactical air forces, with the navy still in dispute.

MOBILIZATION POTENTIAL

Mobilization potential ^[2]	RUS.	UKR.
GNP (1993)	775 billion	205.4 billion
Population	149.6 million	51.8 million
Labor Force	75 million	24 million
18-year old males	1.1 million	365,000
Fit males 15-49	37.7 million	9.6 million

Ukraine cannot easily predict the kind of military threat Russia might mount. Several obvious possibilities emerge, and they must all be addressed. Russia might simply try to grab Crimea and its important naval installations. Russia might try to sever most of the other areas of greatest Russian population from Ukraine. Many of these abut Russia and are thus very difficult to defend, including cities such as Kahrkiv, Luhansk, and Donetsk, all within 75 km of the Russian border.^[3]

A more difficult problem for Russia would be an attempt to reach the substantial Russian population of Odessa, in south-central Ukraine. Many Russians also live in Kiev, Ukraine's capital, about 200 km from the Russian border, and 100 km from the Belarusian border. Finally, Russia might simply try to reconquer all Ukraine. I will argue below that though the last objective is perhaps the least likely, it is the contingency against which the Ukrainians must primarily plan and organize. They cannot hope to do much about the small and intermediate land grabs in the absence of a broader strategic concept. Focusing militarily only on the land grabs would tempt a future aggressive Russia to exploit Ukraine's broader weakness.

The geo-strategic situation

Ukraine is a large country, with a long and topographically gentle border with Russia. It also shares a long border with Russia's plausible ally, Belarus.

Ukraine's Black Sea ports provide excellent peacetime commercial opportunities, but Russian naval superiority would render them useless for resupply in wartime.

Ukraine has a land area of about 600,000 square kilometers, "slightly smaller than Texas." More relevant is a comparison to some militarily interesting areas.

Ukraine is a third larger than the combined areas of Kuwait and all Iraq. It is more than twice the area of former "West Germany." It has almost 4500 km of border. Almost 1600 km of that border is with Russia, and another 900 km is with Belarus. (A military defender would not try to hold every inch; reducing the border with Russia to a straight line still yields a 1000 km front.)

Nor does terrain much assist the Ukrainians. Most of the terrain is wooded or open steppe land, much of it given over to agriculture. It is good "tank country." This openness would provide excellent ground attack opportunities for a large, high technology airforce, but the Ukrainians are unlikely to be able to acquire such a force. The vegetation changes to broadleaf forest as one approaches the border with Belarus. There the Pripet marshes lend some help to defenders. An examination of the paths of German and Russian W.W.II campaigns

indicates that the marshes were viewed as an important military obstacle, though both sides did pass forces through its edges. It seems reasonable for planning purposes to view the Pripet marshes as a rare useful natural defensive asset.^[4]

There is nothing similarly interesting along the border with Russia. There are several rivers behind the northeastern border with Russia, notably the Seym, the Donets, and parts of the Mius. The latter two served as short lived anchors of the German defenses in 1943. But the brutal fact is that there is no noteworthy, militarily useful natural obstacle, until one gets to the Dnipro — which describes a misshapen, left tilted, 800 km long, "S" across the center of the country, and which divides it roughly in half along a north-south axis.^[5]

This is where the German General von Manstein had hoped to anchor his defense had Hitler approved his "counter-offensive" alternative to the abortive Kursk offensive. Once the German offensive at Kursk had ground itself to pieces, the Russians launched a massive counterattack that precipitated a virtual race to that river line. The Russians exploited the chaos of the German retreat to place their own bridgeheads across the river before the Germans could fully arrange their defenses. Given this inauspicious start, the Germans still managed to delay the Russians for more than two months along the Dnipro river.^[6]

While the Dnipro is probably the most useful tactical obstacle in Ukraine, it is only tactical. It can aid an intelligent defender, but it cannot save an unintelligent one.

Finally, a word about industry and raw materials is in order. Ukraine has many of the assets necessary for a war economy. But it does not have all of them, and what it does have is not optimally distributed. Ukraine imports roughly one half of its total energy needs; 90% of its oil and 73% of its gas is imported, mainly from Russia.^[7] Ukraine has surpluses of hard and soft coal. Most of the hard coal comes from the militarily vulnerable Donets basin. Some soft coal is mined west of the Dnipro.

Electricity is generated by both hydro and nuclear power plants. Much of the hydro-power is generated on the Dnipro. Many nuclear reactors are west of the Dnipro.

Virtually all of Ukraine's limited oil and gas reserves are in the northeastern part of the country, east of the Dnipro, vulnerable to Russian attack. Thus, Ukraine's ability to produce sufficient liquid fuel to sustain its field forces for a war of any duration is in doubt. And it is questionable whether sufficient energy can be autonomously generated, even under a system of strict wartime controls, to permit its society and industry to function for any length of time.

Ukraine has a substantial arms industry, and a substantial "heavy" industrial sector useful more-generally for the production of arms. The bulk of this industry is located in eastern Ukraine, in areas of substantial population of Russian extraction, and quite vulnerable to Russian military attack. In sum, if Ukraine wishes to fight a war of any duration, careful planning, organization, and even some investment will be necessary. Some military

production capability should be moved to the western part of the country, particularly for the production of ammunition. At minimum, substantial stocks of liquid fuel will need to be held in western Ukraine. It may even be reasonable to investigate the possibility of producing liquid fuel from soft coal, though the investment costs may currently be beyond Ukraine's reach.

Diplomatic Factors

Because Ukraine is so weak relative to its neighbor, any military strategy must endeavor to exploit all available assets. Some of these assets are diplomatic; Ukraine must use these assets to try to get military allies in the event it is attacked. The odds of success are not great, but anything Ukraine can do to enhance the Russian perception that Ukraine will find allies, or at least assistance, will improve their ability to deter Russian action.

Ukraine is currently on a path that will, if completed, lead it to non-nuclear weapons status within the Nuclear Non-Proliferation treaty. This provides it with one informal and one formal diplomatic lever. Ukraine is giving up large numbers of nuclear weapons and delivery systems which could have provided the ingredients for a powerful nuclear deterrent. Most signatories of the NPT, but the US in particular, have a strong interest in Ukraine not being subjected to nuclear or conventional military coercion, or conquest. If Ukraine loses its independence as a result of its military weakness, after having given up a chance to become a nuclear power, the lesson for other states could not be more stark. Thus, the violent destruction of independent Ukraine would likely result in the collapse of the Non-Proliferation Treaty and a sudden increase in the number of states trying to acquire nuclear weapons. The US may, of course, accept this cost.

The security assurances provided to Ukraine by the US and Russia to induce it to give up its nuclear weapons provide a formal, if weak, diplomatic instrument. In the January 14, 1994 "Trilateral Statement" both the US and Russia reaffirmed their commitment to Ukraine to respect its independence, sovereignty, and territorial integrity, and renounce the use of force against it, "in accordance with the principles of the CSCE Final Act." [8] Unfortunately, this does not add up to much, since the CSCE Final Act includes no sanctions against those who break these principles. Thus, this joint affirmation does not amount to a US commitment to Ukraine's security; but one could argue that it does engage US prestige in the event the Russians renege.

Russia and the US also commit themselves "...to seek immediate UN Security Council action to provide assistance to Ukraine, as a non-nuclear weapon state party to the NPT; if Ukraine should become a victim of an act of aggression or an object of a threat of aggression in which nuclear weapons are used..."[9] The problem here is that if Russia were to attack Ukraine or threaten it conventionally, the US is not obliged to do anything. Ukrainian diplomats could, however, try to argue that any act of war or threat of war by a nuclear superpower

involves an implicit nuclear threat sufficient to warrant US action. Even if this argument were accepted, however, Security Council action would be thwarted by the Russian veto. Thus, this assurance merely guarantees a certain ineffectual hubbub.

Nevertheless, it should be part of Ukraine's diplomatic strategy in the event of trouble.

The combination of the threat to the NPT, and the damage to US prestige, which would result from a US failure to act, cannot guarantee that the US would move forcefully to help Ukraine in the event of trouble. US credibility and influence are not on the line to the extent that it would be if Ukraine were in NATO. But inaction would put the US in a tight spot diplomatically.

The "Partnership for Peace" (henceforth PFP) provides Ukraine with a slightly weightier diplomatic asset. Even if PFP does not come through for Ukraine, it still holds the potential to impose considerable costs on Russia, which adds to Ukraine's overall deterrent power. Paragraph 8 of NATO's "Framework" document for PFP states "NATO will consult with any active participant in the Partnership if that partner perceives a direct threat to its territorial integrity, political independence, or security."⁹^[10] The precise action that would follow such consultation is unspecified. Nevertheless, NATO would look pretty sorry if it either failed to consult, or failed to take any action after consultation. Some politicians and pundits will trumpet the credibility costs of a failure to act. NATO might, of course, compensate for a failure to act on Ukraine's behalf by stronger measures elsewhere, though this would be cold comfort to Ukraine. Fear of these stronger measures elsewhere are, however, another element of Ukraine's dissuasive power.

The Partnership for Peace can be viewed as "NATO's Waiting Room." The tacit bargain with Russia is that many central European states remain in that waiting room so long as Russia remains a good neighbor. If-and-as Russia begins to try to expand its power, the din in the waiting room will become disturbingly loud. The elements are in place for the rapid extension of NATO to Poland, Hungary, the Czech Republic, and Slovakia, even if a threatened Ukraine is tossed to the wolves. Russia can, by its own acts, bring NATO to its doorstep. Stephen Oxman, Assistant Secretary of State for European and Canadian Affairs virtually stated this rationale. "...should reform experience a reversal of fortune in Russia, we can re- evaluate NATO's needs and those of the Central and Eastern Europeans. At the same time, active participation in the Partnership will go a long way toward enhancing their military preparedness and allow partners to consult with NATO in the event of a threat."

^[11] Having set up the PFP, the US and its NATO allies will have a very hard time wiggling out of the bargain entirely without a major blow to alliance interests. Failure to take even this measure would open central Europe up to exactly the security free for all that PFP is designed to prevent. Europe would quickly begin to take on the sorry 1930s quality so eloquently elucidated by John Mearsheimer. Moreover, as noted above, complete inaction would damage NATO's credibility for a probable future confrontation with Russia.

If, as some now argue, NATO expands eastward more-or-less as a matter of course, this useful sanction will have been lost. Nevertheless, it seems that any near term NATO expansion will be accompanied by only limited military redeployments, so long as Russia-US relations remain moderately amicable. Russian policy makers might still calculate that aggression against Ukraine can leave them worse off because of the countervailing actions it would precipitate. Moreover, near term candidates for NATO membership are only a subset of the PFP participants.

Again, Russian action can precipitate more energetic alliance expansion. A word of caution is in order, here, however. If near term NATO expansion is accompanied by energetic military preparations that Russian policy makers view as unprovoked, they may be stimulated to try to reabsorb Ukraine out of their own defensive impulses.

Ukraine has one other diplomatic asset. Thus far, the "state ideology" is organized largely around the idea of "civic" rather than "ethnic" nationalism. Anybody can be a citizen of Ukraine, and a good "Ukrainian." Russians are not a persecuted minority. There are small ethnically Ukrainian elements who might wish to change this orientation. But "civic nationalism" is congenial to the West. Insofar as any future struggle can be portrayed as the "ethnic" Russians against the "civic" Ukrainians, the path of western intervention is eased. Moreover, it is not inconceivable that other states will draw a tragic lesson from an unopposed Russian "liberation" of its brethren in Ukraine. One is better off expelling such potential irredenta.

Ukraine must organize its military power to ensure the greatest probability of outside intervention. Russian fear of outside intervention could add greatly to Ukraine's dissuasive power. Diplomacy needs time to work; it also profits from ghastly television footage. This means Ukraine must, as a matter of priority, organize its military forces to avoid the kind of catastrophic defensive collapse often associated with armored warfare.

The West could assist Ukraine in many important ways short of direct military intervention. But all assistance will have to move through Poland, Slovakia, or Hungary. It is improbable that these countries will be willing to cooperate without full fledged membership in NATO, so membership would have to be extended during the crisis. Ukraine will require outside sources of oil and gas if it is to hold out very long. Replacements for weapons lost in the initial battles would be very helpful. Given that many eastern European countries will, for the foreseeable future, have similar equipment to the Ukrainians, they are a ready source of easily usable replacements and munitions.

One of the most useful forms of assistance that could be provided to Ukraine is intelligence. If Ukraine regularly knows where large Russian ground formations are, its forces will be much less vulnerable to catastrophe, and have many more opportunities to inflict disproportionate casualties on the Russians. (Similar assistance may be possible against enemy air forces.)

Direct military intervention from the West will be very problematical. One suspects that some secret planning has been done for this contingency, but the task must seem daunting. NATO ground and air forces would have to cross vast distances to reach even central Ukraine. The distance from the old inter-German border to Kiev is roughly 1500 km. NATO's relatively few divisions would be swallowed up in the vast spaces of the East, even if they could get there.

The optimum direct military assistance would probably be in the form of air strikes. Effective, sustained, tactical air strikes cannot efficiently be flown from existing NATO air bases in western Europe; 2000 km range sorties could just reach central Ukraine, but would be hard on pilots and would require high levels of aerial tanker support.^[12] (These sorties would also require Polish permission.) Another option would be to fly from bases in Turkey, a NATO ally. Sorties could be flown directly across the Black Sea to Ukraine. Ranges would vary depending on bases and targets, but it is unlikely that any sortie would need to go further than 1500 km. The problem here, of course, would be whether Turkey believed its vital interests were engaged, since the NATO treaty does not oblige them to come to the assistance of a non-NATO country, even if other NATO countries wish it.

NATO ground and air forces might move into Poland and NATO aircraft could fly from Polish bases. (This would have to be negotiated, of course, and the cost would certainly be immediate full membership in NATO for Poland.) Unfortunately, most Polish bases were built to be close to the old "inner-German" border, the expected zone of east-west conflict. There are only about a half-dozen military airfields in the southeastern quadrant of the country that would meaningfully reduce sortie ranges, and thus the need for tankers. Even these would require sorties of over 1000 km, which is still demanding for sustained tactical air attacks.^[13] And, it would take some time to move the support structure forward to operate these bases, and to set up the overland lines of communication to keep them stocked with munitions, parts, and fuel. It seems unlikely that NATO commanders would want to put their very valuable aircraft and support equipment onto Ukrainian bases, without the benefit of a large scale NATO ground force shield. A more arcane, but nevertheless extremely important problem would be the coordination of NATO fighters with Ukraine's own air defenses to ensure that Ukrainians do not shoot at NATO aircraft. This should prove very difficult to improvise.

Because NATO countries lived for nearly a half century with Soviet control over Ukraine, Ukrainians ought not to have confidence that NATO will come to its aid out of narrow strategic interest. Nevertheless, this assistance becomes more plausible, the longer Ukraine can resist, and the longer Ukrainian diplomacy can work. Ukraine should thus try, through its military strategy, to maximize Russian fear of this outcome. Ukraine has available to it a series of fora where it can present its case. Thus, the West will need to repudiate its high minded principles publicly in a series of venues, all ostensibly designed for the very purpose of protecting these principles. Since Munich already happened, this policy has a name and a historical meaning that will provide some additional leverage for Ukrainian diplomats.

Russian Military Power

Estimating the forces that Russia might commit to an attack on Ukraine is very difficult, in part because it is difficult to predict the likely future size and capability of the Russian Armed forces. A prudent military planner would probably assume that for the foreseeable future, a politically energized Russia might be able to mobilize 100 divisions, roughly half as many divisions as the Soviet Union maintained in the early 1980s.^[14] Since Russia inherited roughly one-half of the Soviet population, a future force of 100 divisions seems a conservative upper bound. It is unreasonable to assume that all Russian divisions would be directed at Ukraine, but given the tradition of Russian military planning, and its preference for mass, and the sheer size of Ukraine, a Ukrainian military planner would be foolish to count on facing less than half this force, and of course associated air units.

Russia inherited most of the military equipment of the former Soviet Union. For example, it is credited with nearly 20000 tanks, 19000 infantry fighting vehicles, and 21,000 artillery pieces.^[15] This would easily equip 100 mechanized or armored divisions. This equipment, if maintained, can be made to last a long time; or it can be reconditioned and modernized as resources become available. As a matter of policy, Russia seems intent for now on a total armed forces personnel strength of 1.5 million, roughly one half of which will likely serve in the Army.

The Army is currently credited with 87 divisions of various types--most well equipped with tanks and other armored fighting vehicles.^[16] Russia is also organizing a number of smaller mechanized units (brigades), apparently to be maintained at full strength with long service troops, to function as "contingency" units. Small airborne divisions will apparently also be maintained at high strength for such missions. All 87 divisions are unlikely to survive Russia's current austerity, but given the historical Russian preference for large armies, it is likely that many will.

While there are reports of personnel shortages arising from widespread draft evasion, and the personnel structure of the army is no doubt top heavy with officers and warrant officers, these divisions and their associated support units can be manned in peacetime at an average of 40% strength, presuming a three-quarter million man army. (During the Cold War, it was commonly assumed that a Soviet Division, and its associated non-divisional support units, required about 20,000 people.) In practice, it is likely that there will be a wide variance in the peacetime manning and readiness of Russian Army units, with some at full strength, and some virtually at cadre strength, as was past practice in the Soviet Army. To bring them up to full strength Russia would have to mobilize roughly one million of the twelve million Russian male citizens between the ages of 20 and 32, many of whom have already served in the Soviet Army. The problem does not seem insurmountable, although if widespread draft evasion continues, there will be fewer and fewer men in this age group who have some military training to build upon in the event of mobilization. With about one million men turning 18 every year, it would not be difficult for Russia to sustain a standing force of 1.5 million, if conscription is maintained. Even if half of each annual class is

unfit for conscription, evades it, or is exempted from it, Russia would still have 2.5 million men available at any given time who have been out of the service for five years or less, i.e. who would under traditional planning assumptions be likely to retain some of their military skills.

Finally, one must take account of the CFE treaty agreed sub-limits on Russian strength west of the Urals. Russia is now entitled to keep 6400 tanks, 11,480 other armored combat vehicles, and 6415 artillery pieces in this zone. This would permit the organization of 25-30 divisions, though other treaty constraints ban about 20% of the equipment from active units. If political developments should move in such a way as to precipitate a war with Ukraine, it is unlikely that the Russians would adhere to these limits. They would bring in whatever they thought they needed from anywhere in the country, subject to the constraint of not providing tempting vulnerabilities to other enemies domestic and foreign. Nevertheless, on a day-to-day basis they will not have the bulk of their forces close at hand, and it seems plausible that they will find it in their interest to adhere to the CFE ceilings until the eve of war. This provides valuable early warning indicators if the Russians were to try to achieve a comfortable margin of superiority over the Ukrainians by bringing in forces from east of the Urals. It also would energize western diplomacy. Thus it is my preliminary judgment that Ukraine is better off strategically if the CFE treaty remains roughly intact, even though that treaty also places important constraints on Ukraine. Of course, if Russia were to violate the treaty significantly, it would no longer be in Ukraine's interest to adhere to it.

The analysis below assumes that both sides find it in their interests to adhere to the major provisions of the treaty.

A final speculation on mobilization time lines is warranted. Given that many Russian units would be east of the Urals, have an average manning level of 40% or less, and will have experienced a long period of limited training and uneven conscription since the fall of the Soviet Union, mobilization for a large-scale assault on Ukraine could take quite a long time. Formerly, I estimated on the basis of much open source information that a half strength Soviet division would take at least thirty days to mobilize and prepare for battle, a quarter strength division at least sixty days.^[17] Given the current and likely future disorganization of the Russian Army this would seem overly generous. Equipment that is not being well cared for now, and is unlikely to be well cared for in the immediate future, would require considerable remedial maintenance.

The movement of forces from all over Russia, and the organization of supply depots for a large-scale, heretofore inconceivable, campaign in Ukraine would take additional time. The Russian railroads are likely to continue their past pattern of deterioration, further complicating large scale troop movements. Mobilized civilian trucks, long a staple of Soviet logistical planning, are likely to show up in worse shape than might have been true a decade ago, if they show up at all. These general factors do not permit us to develop a high confidence estimate of how long a Russian mobilization of some 50 divisions for a campaign against Ukraine would take. But it seems unlikely that it could take less than three or four months given current trends. Russia could do much to shorten this

time line with several years of deliberate planning, investment, and organization. In that case, and still presuming no peacetime violation of CFE, the timeline could be reduced to the travel time by Rail from east of the Urals for two to three dozen Russian divisions--perhaps a matter of weeks.

How many divisions would the Russians commit to a war in Ukraine? A number of assumptions need to be made about the total number available (see above), other simultaneous foreign and domestic threats, Russian willingness to rely on nuclear deterrence to deal with other threats such as the PRC, and Russian calculations about the strength and competence of Ukrainian forces. A crude way to proceed is to examine the margin of numerical superiority in major items of combat equipment that the Soviet Union seems to have striven for in the Warsaw Pact military competition with NATO. While there was much debate about the relative effectiveness of the two military coalitions, these crude ratios give us a place to start. There was always considerable debate about what should actually be counted in a NATO:Pact comparison. Moreover, in retrospect one can see why the Soviets may have had doubts about the reliability of their eastern European allies, and thus may have over ensured against their defection. Nevertheless, along the Central Front, one fairly reasonable official estimate circa 1988 gave the Pact 57 divisions to NATO's 33; 17,000 tanks to 8100, and 10000 guns and rocket launchers to 3100. Crudely, the Soviets seem to have liked a standing force ratio between 2:1 and 3:1 in units and equipment. ^[18] Given CFE equipment ceilings in Ukraine, and presuming Ukraine keeps everything to which it is entitled, Russian military planners would need about 40-50 divisions to generate tank and artillery force ratios between 2 and 2.5:1. ^[19] Assuming that Russia keeps all 87 divisions it currently possesses (or the rough equivalent in new types of ground force formations) this would leave Russia with 40-50 divisions of various types for other purposes.

MILITARY ASSETS: UKRAINE AND RUSSIA-1994 ^[20]

	Ukraine	Russia - CFE (W. of Urals)	Russia (all) ^[21]
Tanks	4080	6400	19500 21 ^[22]
Armored Combat Vehicles	5050	11480	37000
Artillery	4040	6415	21300
Attack Helicopters	330	890	1000

Combat Aircraft	1090	3450	4000
Men	450,000	1.45 M	1.71 M
Divisions	unknown	25-30	87

Ukrainian Military Assets

Table 1 shows Ukraine's entitlement under CFE. This equipment can be kept in working condition for many years, though most reports suggest that the Ukrainian Army is not presently paying much attention to training or maintenance.^[23] Alternatively, the equipment can be reconditioned when the resources become available. Perhaps 15% of the Soviet defense industry was located in Ukraine. The Ukrainians are better placed than most to maintain and improve their Soviet military inheritance.^[24]

Ukraine has a population of about 52.5 million, roughly 22% of whom are of Russian extraction. Ukraine is said to plan to maintain a total military personnel strength of 450,000. Currently, including paramilitary forces, the total is somewhat higher, 517,000. The army is the largest force, at 308,000; border guard and national guard add another 73,000 individuals who should be thought of a part of the ground forces. The air force seems overlarge, at 146,000.^[25] Its own Navy is barely 16,000.

Conscription has been maintained, with a two year term.^[26]

The annual class of 18 year old males seems to be around 365,000. A two year term would thus give the standing military access to more than 700,000 young men at any time, if everybody served. Assuming a 20% long service cadre, a 450,000 man military would require about 360,000 conscripts, so there is a surplus, even if those of Russian extraction choose not to serve. 360,000 conscripts serving a two year term would throw off 180,000 trained men per year. If mobilization called up only those separated from active service for five years or less, Ukraine could mobilize 900,000 in crisis--a very respectable figure.

Other countries with mobilization systems such as Finland, Sweden, Switzerland, or Israel mobilize older reservists—to preserve military skills they periodically retrain them after their active service. Thus, Ukraine could find even more soldiers in crisis. In spite of Ukraine's rather considerable inheritance of Soviet military equipment, her greatest long term military resource is these men. They could easily man 45 Soviet-style heavy divisions.^[27] But organized conventionally, Ukraine's TLE limited equipment can arm perhaps 20 divisions. Currently Ukraine has four tank divisions, ten motor rifle or mechanized divisions, five mechanized brigades, and an air mobile division.^[28]

Ukraine has the human material to assemble a competent military force. Ukraine's individual military manpower is unlikely to be less skilled than that of Russia. The population is literate; the country is highly industrialized. It has a large science and engineering establishment. Ukrainians were particularly well represented in the Soviet warrant officer corps (the rough equivalent of western NCO's). Ukrainians were also well represented in the Soviet officer corps and had access to the highest positions.^[29] Moreover, Ukrainian soldiers will have a substantial familiarity with Russian military practice.

The trends, however, are probably not favorable. Given the economic disparities, it is likely that the Ukrainian military will always confront Russian capabilities that they cannot match quantitatively. If inferences can be drawn for the military relationship from relative Russian and Ukrainian rates of political and economic reform, the Russian Army is likely to be superior in leadership, weapons technology, and doctrine, to their Ukrainian counterparts. Unlike some famous David and Goliath stories, there is no reason to believe that the Ukrainians will ever enjoy any decisive tactical, organizational, leadership or technological advantages over the Russians.

Alternative Military Strategies

An aggressive Russia would have three broad options in terms of strategic objectives in a war against Ukraine. The most limited objective would be the simple recovery of Crimea, mainly for narrow strategic reasons. Somewhat more ambitious would be the conquest of areas that contain substantial populations of Russian extraction. This could be limited to the urban areas close to the Russian border, such as the cities of Kharkiv, Luhansk, or Donetsk, and the surrounding countryside of the oblasts that take their names. Any of the preceding might fall under the rubric of a "limited aims strategy."

To recover most areas of Russian settlement however, the objective would be much more ambitious, and would include the entire oblasts of Kharkiv, Luhanska, Donetsk, and Zaporizhzhya, the Crimea, and Odessa. To establish a land bridge to Odessa, it would also be necessary to take Kherson and Mykolaiv. These 9 oblasts, which extend in a belt from north-east to south-central Ukraine, represent roughly 35-40% of the land area of the country. To ensure against counter-attacks it is easy to see how this strategy could grow to include simply all of Ukraine east of the Dnipro., plus Odessa and Mykolaiv. This would include the capture of the city of Kiev, much of which lies on the east bank of the Dnipro, depriving western Ukraine of the country's principal administrative center. This strategy is very ambitious, and scarcely qualifies for the adjective "limited aims." Nevertheless, it does contain some political constraints since it is primarily interested in taking and securing areas of ethnic Russian population.

Finally, Russia might simply opt to reconquer the entire country. If Crimea were the objective, it seems likely that Russia would try to take it with elements of the naval forces still in place there, supported by airborne and seaborne elements. The other objectives would require ground attacks.

The capture of "Russified" areas close to the Russian border would be demanding, militarily and logistically.

Ground operations against the three eastern oblasts would occur roughly on a scale similar to those of Desert Storm. The Russians might employ two dozen divisions. The peculiar configuration of Ukraine's borders makes it possible for the Russians to attack the three easternmost oblasts from three axes simultaneously. And the length of the northern border would enable the Russians to outflank almost any forward defensive system the Ukrainians could organize if they concentrated their present force structure to defend these three oblasts.

Attempts to reach Odessa, or take all the territory east of the Dnipro, would require military operations on the scale of very large World War II offensives, and would need substantial logistical preparations and support.

Forty or fifty divisions might be required. The conquest of the entire country would be even more demanding.

In principle Ukraine has three broad options for a military strategy: forward defense, mobile defense, and strategic defense in depth. I will briefly discuss the strengths and weaknesses of each strategy. Because the third requires some major changes in the structure of Ukrainian ground forces, I will then outline that structure.

Forward defense would require the Ukrainian military to attempt to prevent Russian incursion into most of its territory. As noted above, this would not necessarily require the direct defense of every inch of frontier, but even with the "wrinkles ironed out" the Russian border alone would generate 1000km of front.

(Belarus generates another 600 km or so.)

Moreover, as discussed above, there are no particular terrain features that aid the defense in eastern Ukraine. Ukraine's fourteen odd heavy divisions and five brigades would have a very difficult time covering this front. A good rule of thumb is that a "medium sized/ medium technology" armored or mechanized division such as the kind the Ukrainians can probably field, can populate 25-35 km of front, on average terrain, with weaponry in sufficient density and depth to provide good prospects for a successful defense against a determined, well-armed, quantitatively superior attacker. If that attacker has enough resources, and if the defender has no reserves of additional units and weapons, the attacker will ultimately grind a hole in this force. Taking the high end of the estimate, the Ukrainian force can cover about 60% of the front with no reserves. This leaves it vulnerable to large scale flanking maneuvers. Or, Ukraine could cover the whole front at one division/60 km, with no reserves. This thin defense is vulnerable to catastrophic punctures followed by envelopments. Finally, either disposition is vulnerable to the possibility that Belarus will side with Russia, opening another 600 km of military frontage to tactical exploitation. Forward defense is seductive nevertheless, because several concentrations of Russian

speakers are so close to the border. Ukrainians would reasonably fear that once lost, these areas are unlikely ever to return to Ukraine. It is my judgment that a Ukrainian attempt at forward defense with its current force structure can only end in disaster.

A second strategy would be mobile defense. For reasons enumerated by others, this strategy also has its weaknesses.^[30] Ukraine would gather its mechanized forces into several multi-divisional operational groupings (corps or armies), and attempt through a combination of better intelligence, superior tactical and operational proficiency, brilliant leadership, and high mobility to "box" with roughly twice as many similar Russian groupings. The purpose would be to maneuver for advantage, and to fight only under conditions that would produce greatly favorable exchange rates. This would involve large scale "ambushes" of unsuspecting Russian formations on the move, slashing surprise flank attacks, and speedily executed and completed encirclement operations. Space would often be traded for time. These are very demanding operations.

Unlike the previous strategy, this one would concede, when necessary, bloodless Russian occupation of Russian populated areas of Ukraine. It does, however, hope to recover those areas once Russian forces are smashed in maneuver battles. If the Russians adopt a limited aims strategy, and do not go much beyond these zones, the mobile defense strategy is presented with a problem. Ukrainian forces would have to try to retake them. Given Russian quantitative superiority, technological parity or superiority, probable air superiority, and the advantages that normally accrue to a tactical defender, Ukrainian forces are unlikely to be successful. Ukrainian generals would probably try to devise counter-attacks elsewhere that would jeopardize the Russian hold on these zones. Such counter-attacks might even take Ukrainian forces into Russia. But it will be very difficult to contest a Russian "limited-aims" offensive with a mobile defense.

Aside from losing the border areas without a fight, the strategy is quite vulnerable to catastrophic failure.^[31] There are no obvious reasons why Ukrainians should be able to outfight Russians in mobile warfare. The two cultures are similar. The weapons are nearly identical. The generals were trained in the same schools. In eastern Ukraine, the population--both Russian and Russo-phone Ukrainian, could in many areas prove more hostile to Ukrainian soldiers than to Russians. The Ukrainians would likely be outnumbered by two to one or worse. Russian technical intelligence assets are likely to be somewhat better than Ukrainian, but certainly not worse. Russian command, control, and communications capabilities also seem likely to be superior to those of the Ukrainian armed forces.

Though we have said little about the role of tactical aviation in a Ukrainian-Russian war, there is no reason to believe that Ukraine would enjoy air superiority over eastern Ukraine. Apparently the Ukrainian military is now somewhat enamored with airpower, and hopes to be able to harvest some of the advantages achieved by the

coalition in Desert Storm.^[32] This seems fatuous. The Russians should be at least as good as the Ukrainians, their aircraft should be as good or better, and they should enjoy substantial quantitative superiority. At minimum, this should make life difficult for Ukrainian reconnaissance aircraft.

Maximally, the Russians could themselves achieve air superiority, and harvest some of the advantages in these open spaces that coalition air forces enjoyed in Operation Desert Storm. In the event they should attempt a true mobile defense against any plausible Russian military strategy, limited aims or otherwise, all of the foregoing adds up to a great probability that Ukrainian operational groupings will be surrounded, cut off from outside sources of supply, and annihilated. Alternatively, as they maneuver for advantage, but fail to achieve it, they would simply be run into the ground, exhausted without a safe place to rest soldiers, repair equipment, and replenish fuel and ammunition.

Finally, it is worth noting a strategic vulnerability that both of these strategies share. Even if the Russians start out with a limited aims strategy--with the intent of conquering Crimea, and the three or four easternmost oblasts of dense Russian settlement, the likely catastrophic failure of these forward defense or mobile defense strategies would incur the destruction of most if not all of the Ukrainian army. Thus it runs a very high risk of giving the Russians the "victory disease." The gate will be open to the Polish border, why not take everything?

I have termed the third alternative strategy "strategic defense in depth." The strategy and force posture of Switzerland provides a weak analogy.^[33]³² The Swiss maintain conventional armored forces to resist aggression in the low-lands, but have organized an economic and military bastion in their mountains. The conventional armored forces assert Swiss sovereignty over vulnerable territory; reduce its value to any aggressor by raising the price of transit; and buy time for the bastion to mobilize and prepare to defend against all comers. In the worst case, Switzerland would survive in the bastion to emerge under more favorable strategic conditions to reclaim any less defensible territory occupied by an aggressor. The message is clear; "we never concede."

Ukraine has a much bigger military problem executing this strategy than does Switzerland because its terrain is not nearly as favorable. Unlike Switzerland or other armed neutrals, Ukraine would be the primary rather than an ancillary objective of the aggressor, so its dissuasive task is also politically more difficult. Nevertheless, a careful exploitation of the Pripet Marshes to the North and the Dnipro River should permit the Ukrainians to develop a plausible bastion that the Russians would have to pay a high price to attack. It must be noted, however, that for two or three months of the year rivers and marshes freeze, perhaps sufficiently to much reduce the defensive value of these barriers.^[34] Thus, these barriers must be viewed as building blocks in a defensive system, not solutions in themselves.

Western Ukraine, though weak industrially, is agriculturally rich and ought to be able to feed itself. It does have considerable light industry which could be turned to military uses. Most importantly, it borders Poland, Slovakia, and Hungary, all potential sources of supply if NATO admits these countries, applies

diplomatic pressure, and provides resources. These are big "ifs," but for the diplomatic reasons outlined above, there are reasons for hope. If Ukraine makes its western reaches strong enough to resist for a lengthy period, at least several months, and employs its mobile forces effectively to generate serious combat from the outset of the war, Ukrainian diplomacy will have a chance. If the Ukrainian bastion can garner enough western European logistical assistance to survive, Russia will face the prospect of having to employ large active forces to contain it. It will go even worse for them if western Ukraine can get into NATO. A divided Ukraine would then assume the role in a new Cold War that divided Germany assumed in the last one. But the "inner-Ukrainian border" would be much closer to the centers of Russian power than was the "inner-German" border.

The probability of this sequence of events may not seem especially high. But the possibility of their occurrence should cause the Russians to think twice about aggression of this kind. This is particularly true given that Russia faces other external threats, and the possibility of internal rebellion by some of its non-Russian ethnic groups. Thus, Ukrainian peacetime foreign policy, military strategy and force structure must be organized to convince a future Russian aggressor that the initial military costs of an attack on Ukraine will be high, and that there is a meaningful risk of serious long term strategic costs. A Ukrainian strategy of conventional deterrence requires a resilient military that can resist intensively for a significant period of time.

Ukraine would need two types of military force to execute this strategy. Mechanized mobile forces would be necessary to mount a very large scale "covering force" operation in eastern and northeastern Ukraine. They would buy time for reserve, mainly infantry, forces in western Ukraine to mobilize and prepare defenses in depth. They would also attempt to erode the combat power of advancing Russian formations.

As part of this strategy, Ukraine should also be able to put itself into a military position to dissuade the Russians from small-scale, "spontaneous" land grabs. A mixture of border guards and a few ready, heavy divisions close to the border in eastern and northern Ukraine should be sufficient. The intent would simply be to force the Russians to think hard about military activity, and to assemble substantial forces if they wish to attack. The Ukrainians would not pretend to have an ability to stop the Russians if they are truly committed. But Ukraine would be in a position to make a bloody assertion of sovereignty and to force some preliminary military preparations on Russians that would both provide strategic warning and create a possibly advantageous diplomatic disturbance in the west.

The bulk of Ukrainian mechanized forces (perhaps a dozen reorganized divisions, see below) would be committed to a large-scale "covering force operation" in north central and eastern Ukraine. Again, however, there would be no pretense at a successful defense against a determined Russian challenge. Their main purpose would be slowing the Russian advance towards the Dnipro and western Ukraine to buy time for large scale mobilization

and defensive preparations. Additionally, this phase of the campaign would endeavor to exploit every advantage and tactic typically employed by outnumbered defenders to inflict disproportionate attrition on the attacking Russians.

This campaign would also have the political mission of asserting Ukrainian sovereignty over eastern Ukraine.

Extensive demolitions would supplement more conventional military operations to slow the attackers' progress, and complicate their subsequent logistics. Much of this could be organized well in advance; critical facilities can be "pre-chambered" to speed the placement of explosives. Necessary explosives can be cached close to the designated targets, under the control of local police forces or reserve military formations, as is done in Switzerland, Finland, Sweden, and even Germany. As the Ukrainians retreat into geographical areas where Ukrainians constitute a greater ethnic majority, it may prove possible to organize "stay-behind" forces to collect intelligence on the Russians and engage in partisan warfare. This too should be planned in advance.

Unlike the pure mobile defense, however, Ukrainian generals would be instructed to err on the side of caution in this covering force operation. It would be understood that the Russians have a powerful advantage and cannot be decisively defeated. Ultimately, a substantial percentage of these mobile forces would be needed to assist in a defense of the Dnipro line, so their complete destruction cannot be risked in a quixotic pursuit of decisive victory over quantitatively superior Russian forces. My own crude estimate is that the Ukrainians could not afford to lose more than about one-half the combat power associated with these units. These operations will thus require considerable military skill, and a great deal of self-discipline at the command level. They will not be easy.

It would be prudent to hold six (reorganized) heavy divisions west of the Dnipro as a strategic reserve.

Perhaps four of these would be arrayed across the northern border with Belarus, to provide an insurance policy against any Russian exploitation of that vulnerability and to guard the approaches to Kiev. Two might be deployed in the south, near Odessa, to deter military action from Russian forces in Transnistria, to guard against rebellion by Russians who live in the Odessa oblast, and to dissuade the Russians from exploiting their naval dominance to mount an amphibious attack against the Ukrainian coast.

The emerging Ukrainian force structure is only partially adequate to the strategy outlined above. A western Ukrainian "bastion" will require far more effort than merely holding a mechanized, 6-division strategic reserve. The basic problem is that even this bastion needs to be defended; the Belarus border would generate about 500-600 km of front to be defended, and there would be an 800 km Dnipro River defense line to guard. The reorganized Ukrainian force of eighteen mechanized divisions would still be insufficient. Because many of them would suffer heavy attrition in the battles in the eastern part of the country, the real strength of Ukraine's mechanized forces, by the time they managed to cross the Dnipro (if they did), would be much less than when the fighting started.

Ukraine must find a way to exploit the large number of trained reservists its society and its conscript army can produce. But CFE sublimits make the organization of dozens of additional mechanized divisions illegal--even if Ukraine could afford them, which it probably cannot, at least for the foreseeable future.^[35] Here Ukraine must turn to practices evolved by other militaries, somewhat similarly placed.

During World War II, the German Army faced problems similar to those of Ukraine. It had many more soldiers than it could equip in armored divisions. Its economy could not generate the equipment necessary, nor could its petroleum resources fuel that equipment if it were fielded. Particularly in the East, the Germans had vast stretches of conquered terrain that they hoped to hold for the Nazi empire. Finally, as Russian industry roared into high gear, the Germans faced a flood of very good enemy armored fighting vehicles, heavy artillery, and munitions. The German expedient was to arm their infantry with large numbers of cheap anti-tank weapons and employ truly vast numbers of mines of every type. Where they knew they would fight the Russians, prepared defenses in depth were organized to protect the infantry from the massive Russian artillery barrages, and to slow the momentum of the Russian armor. German armor was held in reserve for counter-attacks. In the end, this system of defense was swamped by the Soviet Union's material superiority, and, to be fair, its generals' growing mastery of armored warfare.

Nevertheless, the Germans exacted a very high price from the Red Army for its successes.

Even within the CFE constraints, the Ukrainians ought to be able to organize a very large number of motorized infantry divisions with potent anti-armor and anti-aircraft defenses--neither of which are constrained by CFE. Other key assets that are constrained will have to be strictly rationed--especially tanks, infantry fighting vehicles, and artillery. Careful reorganization supplemented by limited procurement could yield a force of roughly 50 infantry divisions, with considerable defensive but little offensive power. These would be supported by 18 (small) mechanized divisions. A dozen of the latter would be committed to delay, and sovereignty-assertion missions in the east. The others would concentrate in the west to create the "bastion."

Ukrainian heavy divisions would be stripped down to bare bones formations with 150 tanks, 150-200 other fighting vehicles, and 54 medium self propelled artillery pieces each. They would be aggregated into small 2-3 division corps. Each corps would be supported by a multiple rocket launcher brigade of roughly 100 systems. Most of the mobile air defense assets in Ukraine would be divided up among these heavy divisions.

The rigorous slimming of these units would free up nearly 2500 guns and heavy mortars, 1400 tanks, and an equivalent number of infantry fighting vehicles to provide basic equipment for 50 infantry divisions. Some would say that this use of scarce armor is a mistake, but the historical record suggests that small armored tactical reserves greatly stiffen the defensive power of infantry units. Trucks and engineering assets for these divisions would need to be mobilized out of the civilian economy.

The less mobile air defense assets that Ukraine has inherited from the old Soviet strategic air defense system would provide the basis for air defense belts along the Dnipro and the Belarussian border. Anti-tank guided missiles (ATGM's) currently owned by Ukraine would be distributed across these divisions. As financial resources become available additional ATGMs would be acquired. Substantial numbers of more basic anti-tank weapons-- shoulder fired rockets, large caliber recoilless rifles, and towed high velocity anti-tank guns would be collected from existing military units, or manufactured. Finally, to compensate for the relatively sparse artillery assets in these units, very large numbers of medium mortars (82mm) would be acquired. (120 mm mortars would be better, but they are counted under the artillery ceilings in CFE, and thus Ukraine cannot acquire more of them.) A notional divisional TOE (table of organization and equipment) is presented below.[\[36\]](#)

Infantry Division	Major Equipment
4 infantry regiments	24 120 mm mortars (6 per infantry regiment)
3 infantry battalions each	-96 heavy recoilless rifles or high velocity anti-tank guns (8 per infantry battalion) -144 82mm mortars (12 per infantry battalion)
2 light infantry/ reconnaissance battalions	
1 combined arms tank/ mech infantry battalion	25-30 Tanks and 25-30 infantry fighting vehicles equipped with anti- tank guided missiles
2 artillery battalions (12 guns each)	24 artillery pieces
1 anti-aircraft artillery battalion	Heavy automatic weapons and shoulder fired SAMs for close in anti-aircraft/ helicopter defense
Engineers, maintenance, and supply as needed	

This division should be able to populate with its units and weapons 20-25 km of front in depth with sufficient density, to create substantial problems for an attacker.^[37] (This is my personal estimate; more detailed technical analysis is necessary to support it.)^[38] The terrain should have some natural defensibility, and must be reinforced with mine-fields, obstacles, and fortifications for the troops.^[39] It would be reasonable to make some of these preparations in peacetime, as other countries do.

Some key urban objectives, such as Kiev, span the river line. Here, the ruthless expedient of urban warfare must be adopted. The city itself becomes a key part of the fortification system. Finally, depending on the availability of resources in peacetime, it would be reasonable to organize additional zones of resistance even further to the West. At some point in the course of a Dnipro River defensive operation, a Ukrainian commander might determine that organized withdrawal offered a better chance to salvage the force for continued warfare than would continued stubborn resistance at the river line.

A 50 division force of infantry divisions would permit a reasonably dense defense of some 1000-1250 km. This is not quite enough, given the 1400 km of northern and eastern perimeter that the bastion will have to defend. Thus, even this force will require very careful management. It may be true that some parts of both lines of resistance offer sufficiently difficult terrain that they can be defended even more economically. The Dnipro line will require a major water-crossing operation by Russian forces; some portions of the river appear to be virtual lakes on a map, and cannot simply be bridged. As noted earlier, the Germans and the Russians tended to avoid the Pripet Marshes in World War II, so some parts of the Belarussian border may also facilitate an economy of force. Moreover, there should be sufficient trained personnel to organize additional units, though they will lack even the very spare stock of artillery, heavy mortars, tanks, and infantry fighting vehicles allocated to the first fifty infantry formations.

Without reinforcement by mobile, mechanized reserves, these frontline infantry divisions can be ground away in critical sectors; the extended defensive system will then collapse, and large numbers of infantry units will simply be surrounded. Fortunately, even a 50 division Russian force would not be able to muster highly favorable force ratios everywhere, the Russian army would be able to mount a finite number of main attacks.^[40] As these materialize the front-line Ukrainian infantry divisions would be supplemented in the defense by the armored divisions and rocket-launcher brigades held in reserve. The historical record of armored breakthrough operations suggests the critical importance of these mobile reserves.^[41] Additionally, Ukraine is entitled to 330 attack

helicopters under CFE, which would form additional, powerful mobile anti-armor tactical reserves. A sequence of breakthrough battles by a quantitatively superior enemy will ultimately exhaust even these reserves, or at least their fuel. When they are gone, the frontline infantry defenses will crack. For this reason, even the defense suggested here would probably ultimately require fuel and weaponry from outside the country to survive beyond a few months of intense combat.

A word of candor is in order on the nature of the combat that would be necessary to make this military concept work. The essence of the combat power of the organization I propose is the willingness of the Ukrainian soldier to fight and die for his or her country, in a war that may seem a hopeless cause. This is not a US or even an Israeli military system that strives to beat its adversary mainly through technological superiority, highly trained people, enormously competent leadership, and brilliant tactics. As noted elsewhere, the Ukrainian Army has no chance of achieving this, and they will be substantially outweighed in major items of combat equipment. Historically, the kind of fighting proposed here has taken a terrific toll in casualties--thousands, perhaps tens of thousands, would die. This organization can only inflict casualties on a mechanized adversary if it is willing to accept casualties itself. The mind of the individual Ukrainian soldier is the key. What is the commitment to an independent Ukraine? How intense is Ukrainian patriotism, or nationalism? ^[42] The answers to these questions are already in doubt in many parts of Ukraine. If Ukraine cannot devise a host of ways to convince its neighbors that it can find a million soldiers willing to die on any day for the sovereignty of the country, then the deterrent power of this military system will be weak.

Little has been said thus far about Ukraine's air force. Ukraine is entitled to 1090 combat aircraft under CFE. This would be a sizable force, and according to the IISS Ukraine actually deploys closer to 900 aircraft.

Given Russia's numerical superiority (see Table 1), and likely qualitative parity or superiority, it is difficult to see how Ukraine can expect decisive results from its air force. It is unlikely to achieve "command of the air." Instead it must organize itself like the Swedish or Swiss air forces--to stay in the game in spite of adversity. If employed with care a Ukrainian air force can prove quite useful. Deep interdiction, attacks on enemy airfields, and even close air support are probably unaffordable luxuries. Three purposes come to mind. First, the air force must stress its defensive missions--especially defense of the western bastion. Second, some part of the air force should specialize in attacks in direct support of ground forces--mainly "battlefield air interdiction." (BAI). Close cooperation with the heavy divisions waging mobile warfare in the east is a must. The ability to concentrate attack aircraft to assist the ground forces in their maneuvers may spell the difference between success and failure for these forces. Sudden, large-scale air attacks on Russian ground formations may be essential to buy time for scarce, hard pressed, ground forces either to set up an attack on a vulnerable and isolated enemy unit, or to break

contact from enemy units when the going gets too tough. The timing and placement of such air attacks is probably more important than their sophistication. Anti armor cluster munitions and scatterable mines are best for quick in-and-out attacks. The likely strength of Russian air forces will not permit "PGM tank plinking" US-style.

Offensive air power will also prove useful for a third mission. If and when the Russians try to force the Dnipro Line, artillery will likely prove their most dangerous asset. Typically in breakthrough operations, the defenders' positions must be heavily battered by either artillery or air power to break their integrity. Ukraine's inherited strategic air defense Surface to Air Missiles, plus its air defense fighters, should be able to make it difficult for Russia to employ its air force for this purpose. Instead, Russian soldiers would likely resort to their traditional expedient, massive artillery barrages.

It will be difficult, if not impossible, for Ukraine to muster sufficient artillery to silence Russian artillery in counter-battery duels. Ukrainian gunners are unlikely to enjoy any offsetting technological or qualitative advantage in such duels. Since Ukrainian infantry divisions will not have much armor, they will not normally have the option of backing out from under the Russian barrage. Ukrainian attack aircraft should then focus their efforts on the enemy artillery. Such air attacks are unlikely to destroy many of the attacker's guns--but they may be able to hinder the concentration of guns and munitions for specific breakthrough operations, buying time for the ground forces to improve defenses and move reserves. They may also disrupt the artillery "fire plan," improving the odds that parts of the ground defense will survive to engage the enemy's armor.

To increase the Russian perception that Ukraine might actually get western assistance to execute this strategy, there are a range of requests the Ukrainians might make of NATO in the context of the Partnership for Peace. Ukraine should seek joint air defense exercises that would familiarize western and Ukrainian air force officers and air defense officers with the coordination problems they would face in a real war. Ukraine should suggest that the Polish air bases closest to it are seen as assets, not threats, and should encourage the Polish air force and NATO to practice forward movement of NATO aircraft into these bases, again in the guise of joint "peacekeeping" exercises. They should also note their interest that these bases remain in good shape. Ukrainian Army personnel should seek joint training opportunities with NATO that would familiarize them with NATO anti-armor weapons. And Ukraine should suggest that anti-armor weapons that NATO armies might intend to retire could still find a useful life in Ukraine. Alternatively, they could simply ask that such weapons be stockpiled, rather than sold or destroyed. The railroad gauge change yards that transshipped cargo from Russian to European trains should be well maintained so that supplies could be moved East expeditiously. Some might object that these kinds of exercises go beyond what is implied in the Partnership for Peace. But it does not seem beyond the creative powers of diplomats to rationalize them. Ukrainian diplomats are in a position to argue quite strenuously for these measures.

A final cautionary point is in order. Having organized this large force, Ukrainian planners will be tempted to try their luck at forward defense. As noted earlier, a "straightening-out" of the Ukrainian-Russian border can bring the line to be defended down to about 1000 km. Why not use these large motorized infantry forces to defend it? This would be a risky plan. First, it will be more difficult to get the Ukrainian defenses organized if divisions mobilized from all over the country have to move to the eastern and northeastern frontiers to begin organizing their defenses. Second, as noted above, the terrain seems much less favorable to the tactical success of these largely infantry formations. The Dnipro itself is a meaningful addition to their defensive capability as are the Pripet marshes. Third, though the fifty odd divisions could handily populate the 1000 km front with Russia, the 900 km frontier with Belarus would be left undefended, with most forces too far eastward to shift to the West in the event of an attack there. The Pripet Marshes are a useful defensive asset, but it seems unduly optimistic to expect them to stop a Russian drive without actual defensive operations. Finally, the distinctive shape of the frontier to be defended (see map) makes it very difficult to organize a forward defense that is not peculiarly vulnerable to very large scale encirclement operations. If the Ukrainian defensive system were broken in an attack originating along the northern border, where Belarus, Russia, and Ukraine meet, the entire Ukrainian force to the East would be vulnerable to a vast encirclement. The possibility of this kind of high-payoff, decisive victory, is what gives offenders confidence, and contributes to the breakdown of conventional deterrence.

Objections

There are six possible objections to the defense concept I have outlined. a.) It is the wrong concept given the threat. b.) It will not work. c.) It is unnecessary. d.) There are better ways to defend Ukraine e.) A plan that accepts from the outset the loss of much Ukrainian territory is simply politically untenable f.) A nuclear Russia can always coerce a non-nuclear Ukraine; conventional forces simply do not matter. I will discuss each of them briefly.

First, it is clear even from my own discussion that this concept involves risks. One obvious one is that Russia would simply pursue a limited aims strategy; this force is insufficient to stop it. I accept this risk because there is essentially no solution to it. All three military strategies outlined are vulnerable to limited aims attacks. By virtue of holding most forces in reserve, the "defense in depth" permits the adversary to execute the strategy with fewer forces, but the Russians are unlikely to be so short of forces that they cannot execute it in any case. Moreover, sufficient force is available to compel the Russians to undertake a deliberate build up for even a limited aims attack, providing a little time for Ukrainian diplomats to do their work. And the forces should be sufficient to exact a price, however, small, from the Russian troops. The Russians cannot undertake this strategy casually.

More importantly, some would argue that the bastion really cannot be held. Ultimately, if Ukraine is utterly abandoned by the West, this is true. Nevertheless, even without western help, the defenses there could impose very high costs on the Russians. The bastion strategy provides Ukrainian diplomacy with the time and the "events" necessary to have a chance to win the help of the West. It minimizes the possibility of abandonment to the extent feasible. Even if help comes, one half of Ukraine may still be lost. It will be a long time, if ever, before it is recovered. This is true, but also unavoidable.

A third argument is implicit in the peculiar character of post-Cold War discourse on international politics. Violent struggles of the magnitude envisioned here among great and middle sized advanced industrial powers have come to be viewed as "inconceivable." There is a widespread inclination to view them as beyond the organizational, economic, social, and political capabilities of these countries. The inherent irrationality of such struggles against the backdrop of modern societies that prize rationality has come to be viewed as a barrier to such conflicts. Many believe that the spread of democracy also makes such wars unlikely among democracies, since "median voters" will demand alternative solutions from their leaders on both sides. In short, while limited uses of military force remain possible, deliberate large-scale aggression of the type discussed here is simply not something Russia could or would do.

This is a popular impression, but it is still a weak reed upon which to base the security policy of a country. Even if current patterns of international politics appear to conform to this view, Ukraine would be advised to insure itself against the possibility that international politics could turn nasty. The defense concept I have advanced can be put in place in stages. The more risky international politics seems, the more resources can be poured into its organization.

Fourth, Ukrainian officers will advise against it.

They will have much trouble escaping their Soviet roots and their reading of the lessons of Desert Storm. Ukrainian military professionals will prefer technologically sophisticated, well-equipped, ground and air forces, even if budget constraints necessitate that they be small. They will think of themselves as the army of a great power, with little to learn from the likes of Switzerland, Finland, or Sweden. The Russian army professes an inclination itself to go the route of high quality/ high technology, so the argument will be made that the Russians are best countered with a similar force. The problem here is that even if the Ukrainians can match this force qualitatively, they can always be outweighed, perhaps by as much as three to one.

Political scenarios can be written whereby this somehow does not occur, but it is an omnipresent risk. Rather than condemn the Ukrainian interest in a high quality, high technology, force, my proposal allows that a force of this kind can be quite useful, so long as Ukraine maintains a larger force of more traditional infantry units.

Even if Ukrainian planners believe that the mechanized front end of their force deserves priority, they can still put in place the basic elements of the bastion defense I have outlined. If and as conditions change they can re-evaluate their priorities and throw resources where they seem most warranted.

Fifth, the plan could prove untenable in Ukrainian domestic politics. How could any Ukrainian politician admit that large sections of the country would be deliberately abandoned in a covering force operation, that space would self consciously be traded for time? Ukrainian nationalists could easily view such a plan as a deliberate invitation to the Russians to take the territory.

Proponents might be labeled as traitors. Those Ukrainian officers who do now identify strongly with their new country could find the strategy a blow to their emergent patriotic institutional identity. These objections are more difficult to counter. Here I would argue that if these reservations prove strong, the concept should be amended to account for them. Arguably, somewhat greater resources could be devoted to the covering force battle. Though this would be risky from the point of view of the ultimate defense of the eastern bastion, the price might be worth paying to ensure a more general commitment to the essential concept. Indeed, one could carry this argument even further. Ukrainians of Russian extraction might view the whole concept as excessively anti-Russian in its focus. The concept could be adapted somewhat to give it more of an "all azimuths" quality, in much the same manner that Sweden and Finland did during the Cold War to sustain the military image necessary to support their nominally neutral foreign policies. As these countries understood, one of the greatest sources of the deterrent power of a military concept of this kind is the projection of an image of national unity. It could make sense to trade some of the technical and tactical strengths of the "ideal type" military concept I have proposed, in order to achieve greater political cohesion in the country as a whole.

Sixth, the argument can be made that if Russia

genuinely wants anything from a non-nuclear Ukraine, all it has to do is threaten a nuclear attack. Without a US nuclear guarantee, and US forces in place to render such a guarantee credible, Ukrainian leaders would have to be insane to resist any Russian demand accompanied by a nuclear threat. This is obviously true. Russia is only deterred from such a coercive nuclear threat by the fact that it cannot be hidden from the world. While others might not rush to Ukraine's assistance, Russia would have to reckon with a rejuvenated strategic nuclear arms race with the rest of the world's nuclear weapons states, and a sudden outbreak of nuclear proliferation on its frontiers. This is cold comfort to Ukraine, but these consequences are nearly inevitable; thus they should influence even a quite aggressive future Russian leadership to conduct their imperialism conventionally. A counter-argument is that these negative consequences will occur even in the event of Russian conventional aggression, so why would Russia forego the chance of a bloodless victory that nuclear coercion would offer? During the Cold War, neither nuclear superpower employed nuclear threats for purposes of naked conquest, so it seems plausible that even under conditions of an already intense arms competition, both feared that something even worse could

happen if nuclear weapons were used this way. Sadly, this debate really cannot be settled in the abstract. If Ukrainian strategists believe that Russia would threaten nuclear attack, they would be wise to hang onto some of their nuclear weapons. Otherwise, they should not bother to invest in a conventional defense with any anti-Russian component; this would at least save them some money.

Conclusions

In this essay I have tried to develop a non-nuclear defense concept for Ukraine. This has, of necessity, required the identification of the most plausible adversary. I do not view this war as inevitable. Indeed, I believe that Ukraine can, through its domestic and foreign policies, and through its military planning, do much to avoid it. The solution recommended here is a political-military strategy. It accepts that all of Ukraine cannot be held against a motivated Russian attack. But it tries to organize Ukraine's military force in such a way that important extant political/diplomatic resources can be energized on the side of Ukraine, and considerable direct military costs can be imposed on Russia. Successful Ukrainian mobilization of these resources may produce very bad strategic consequences for Russia, consequences that should be obvious. This solution is more likely than most to be affordable for Ukraine. At the same time that the plan improves Ukraine's ability to deal with a full scale Russian threat to its independence, it preserves a capability against less deliberate, limited Russian threats. It provides some capability against a "casual" Russian limited aims strategy, one that might emerge quickly out of an inadvertent crisis. It only provides a minimal capability against a deliberate, limited aims strategy, but it does help deter such a strategy from escalating to full scale conquest. By so doing, it should also impose some caution on a future Russian aggressor, who would not be able to count on a cowed, defenseless Ukraine to quietly resign itself to the success of a Russian limited aims strategy.

Though Russia may complain about any military planning directed against her, this particular plan is about as "defensive" as one can get within the realities of armored warfare. It does not require a major shift of Ukrainian forces toward the Russian border. It actually sacrifices some Ukrainian "offensive" capability for a very substantial improvement in its defensive capability.

Ukraine has chosen, under considerable international pressure, to relinquish the nuclear weapons on its soil, and to sign the nuclear non-proliferation treaty. A nuclear deterrent strategy would, in principle, be an alternative for Ukraine. Many criticisms have been leveled against such a strategy. Little consideration has been given to the viability of non-nuclear strategies. In my judgment, the strategy developed here is the most credible conventional strategy that Ukraine can attempt. Yet, it clearly has its own problems and vulnerabilities.

A useful next analytic step would be a systematic consideration of the strengths and weaknesses of this conventional strategy vs a nuclear one. To do such a job thoroughly is beyond the scope of this essay.

Nevertheless, the outlines of an approach do emerge. The strategy I have developed gives the Ukrainians almost no ability to stop a determined Russian attempt to conquer territories populated by ethnic Russians. It is moderately good at raising the costs of an attempt to conquer the entire country, but without outside assistance, it will ultimately fail.

Presuming that Ukraine could generate a small, secure second strike capability against Russia, what problems might nuclear deterrence solve? It seems reasonable, on the basis of deductions from two generations of nuclear deterrence theory, that Ukraine could easily deter the Russians from attempting conquest of the entire country.

But nuclear deterrence theory would not necessarily suggest that Ukraine can easily deter a Russian limited aims strategy. Generally, the balance of wills is believed to favor the status quo power in the cold war nuclear standoff. But Nationalism and the legacy of Russian domination of Ukraine may make the balance of wills difficult for both sides to calculate, and lead to deterrence failures.

Ukraine would think of itself as trying to deter attacks on its territory. Russia might think of itself as trying to protect its countrymen--accidentally marooned on territory that has historically been Russian, but which is now incidentally Ukrainian. While Ukrainian possession of nuclear weapons would make a Russian limited aims strategy inherently riskier than it would be in the absence of such weapons, Russians might still believe that the balance of interests favored them, and not Ukraine. They could perceive that a conventional conquest of areas of Russian settlement, covered by a threat of nuclear retaliation against Ukrainian populations, would neutralize a Ukrainian deterrent strategy. Thus, though Ukraine would certainly in the net have more deterrent power if it had nuclear weapons, it is less clear that nuclear weapons would constitute a particularly reliable counter to a Russian limited aims strategy. Nuclear deterrence may protect these areas somewhat better than conventional forces would, but the strategy involves a significant risk of failure.

If Ukraine were to revisit the question of an independent nuclear deterrent, thwarting the limited aims strategy probably ought not to be the main impetus. The more serious tradeoff is between the combined deterrent power of the conventional defense in depth, coupled with diplomacy, relative to that of a small second strike capability, to deter the Russians from attacks on areas where ethnic Ukrainians are clearly and substantially in the majority. Here, one suspects that nuclear deterrence clearly dominates.

Any strategy involves tradeoffs. Ukraine is unusually disadvantaged: it borders an historically ambitious great power three times its size and wealth; it contains 12 million of that great power's countrymen; most of its terrain is quite gentle. The wealthiest countries in the world, on whom Ukraine must rely for economic aid and

export markets, have demanded that Ukraine give up the nuclear option as the price of the assistance the country needs to build a viable economy and society. These are facts that Ukraine cannot change. It is the task of strategy to accommodate these facts in a plan that has the greatest hope of securing the country's future.

- [1] Ukrainians expect threats from other directions as well; indeed virtually all its neighbors are perceived to have some kind of claim against at least a sliver of territory now controlled by Ukraine.
- [2] Source: CIA, The World Factbook 1994, pp. 329-332, 409-411.
- [3] Most Russians, 6-7 million, are to be found in the "Donetsk- Dnipro" region of Ukraine-roughly 37% of its land area. This is also a zone of great industrial capacity. Perhaps another 3-4 million Russians are to be found in the south, in an area straddling the banks of the Dnipro, especially in the much disputed Crimea. Ukraine: An Economic Profile, CIA, November 1992, pp. 23-25, 32
- [4] On the Pripet marshes see New Encyclopedia Britannica, 15th ed. Micropaedia, (Chicago: 1994), vol.9, "Pripet Marshes," p. 709.
- [5] On the Dnipro River see New Encyclopedia Britannica, 15th ed., Macropaedia, (Chicago: 1994), vol. 18 "Europe," especially pp. 581-584
- [6] For accounts of these battles see John Erickson, The Road to Berlin, Stalin's War with Germany, vol. 2, (London: Weidenfeld and Nicolson, 1983), pp. 87-135; John Keegan, The Times Atlas of the Second World War, (New York: Harper and Row, 1989), pp. 124-127, 146-147; and B.H. Liddell-Hart, The History of the Second World War, (New York: Putnam's and Sons, 1970), pp. 477-497.
- [7] "Energy in the Newly Independent States of Eurasia," Map, CIA, 8- 92; Ukraine: an Economic Profile (CIA, 11-92), p. 15.
- [8] "Trilateral Statement by the Presidents Of the United States, Russia and Ukraine," Arms Control Today, Jan/Feb 1994, pp. 21-22.
- [9] Ibid.
- [10] "Partnership for Peace: Invitation and Framework Document," (January 10, 1994), US Dept. of State Dispatch Supplement, (January 1994) Vol. 5. No. 1, pp. 5-7.
- [11] "U.S. Perspectives on Building Peace and Prosperity in Central and Eastern Europe," (February 17, 1994 address at Harvard University), US Dept. of State Dispatch, March 14, 1994, Vol. 5, No. 11, p. 148.
- [12] In Desert Storm, many sorties were flown at roughly 1500 km range against "strategic" targets, deep in Iraq. Tactical sorties appear to have been flown more often at ranges of 1000 km or less. See for example Map VI-1, showing the distribution of allied combat aircraft in the theater near the end of the war. Conduct of the Persian Gulf War (US Department of Defense, April 1992) pp. 142-143.
- [13] Charles T. Kelley, Jr., Daniel B. Fox, and Barry A. Wilson, "A First Look at Options for Poland," in Paul Davis, ed., New Challenges for Defense Planning (Santa Monica: Rand, 1989), pp. 451-476. These analysts suggest that 120 F-15Es and 360-480 F-16Cs, operating against a force of roughly 25 Russian divisions, in a zone just to the east of the Polish Belarussian border, could destroy slightly more than one half of these divisions in 9 days. But they do not believe this can be accomplished from NATO's own bases, roughly 1000 km away. "Once a crisis had occurred, or when it had been determined that combat was imminent, NATO would need to deploy forces into Poland if it agreed to assist Poland. Because of their mobility, air forces would be able to deploy faster, and because of their long combat radius, they would not have to move as far into Poland as ground forces in order to engage the attacker's forces." p. 475.
- [14] In 1984, official US Army sources credited the Soviets with an army of 1,825,000 men, and 191 divisions. The Soviet Army Operations and Tactics, FM 100-2-1, (Headquarters, Department of the Army, July 16, 1984), p. 1-3.
- [15] Much of the basic military data in this and subsequent paragraphs is drawn from The Military Balance 1994-1995, (London: Brassey's for the International Institute for Strategic Studies, 1994),, entries for Russia, pp. 107-119; Ukraine pp. 78, 103-105; see also the Table, "Conventional Forces in Europe," The Military Balance 1993-1994, (London: Brassey's for the International Institute for Strategic Studies, 1993), p. 252.
- [16] Reportedly there are 17 tank divisions, 57 motor rifle divisions, five airborne divisions, and 8 peculiar "machine gun/artillery divisions." There are also 11 motor rifle brigades, the actual organization of which is unknown but which I will assume to be roughly a third the strength of a motor rifle division. IISS, Military Balance 1994-95, p. 99. One analyst projects, without explanation or citation, that by 1995 there could be a third as many divisions, but six times the number of brigades. see Roy Allison, Military Forces in the Soviet Successor States, Adelphi Paper 280 (London: IISS, 1993), p.29. This would still be a potent force-- aggregating to the equivalent of perhaps 40-50 heavy divisions in combat power. Depending on the size of the Ukrainian forces, a Russian Army of this size would have to take greater risks on other fronts in order to amass very favorable force ratios against Ukraine. Another recent study projects a future Russian force of some 50 heavy divisions, also without explanation or citation. See Charles T. Kelley, Jr., Daniel B. Fox, and Barry A.**

Wilson, "A First Look at Options for Poland," in Paul Davis, ed., *New Challenges for Defense Planning* (Santa Monica: Rand, 1989), pp. 451-476. It seems reasonable that 50 heavy division equivalents is a lower bound for the Russian Army, 100 an upper bound.

[17] Barry R. Posen, *Inadvertent Escalation* (Ithaca: Cornell U. Press, 1991), pp. 89-91.

[18] Statement on the Defense Estimates 1988 1 (London: HMSO, 1988), pp. 61; Employing a slightly more expansive methodology, German figures estimated 69 Pact divisions to 52; 26,900 tanks to 11,250, and 23000 guns, rocket launchers, and heavy mortars to 7300, ratio of 1.3:1 in divisions, 2.4:1 in tanks, 3:1 in artillery. NATO- Warsaw Pact Force Comparison 1987 (Bonn: FRG Ministry of Defense, 1988, p. 24.

[19] The actual equipment holdings of any current or future Russian tank or motorized rifle division is impossible to estimate. Ostensibly a reorganization of Soviet divisions began in the late 1980s. Many former Soviet divisions have been relocated, or eliminated. Much equipment from divisions formerly in eastern Europe has been shifted east of the Urals. The nominal planned Table of Organization and Equipment for a tank division is 264 tanks, 430 infantry fighting vehicles and armored personnel carriers, 190 artillery pieces and multiple rocket launchers, and 13,500 people. For motor rifle divisions it is 162 tanks, 650 APCs and IFVs, 190 artillery pieces and MRGs, and 16000 personnel. There are 17 TDs and 57 MRDs in the Russian Army. Handily, a weighted average yields a typical heavy-division strength of 190 tanks and 190 guns and MRLs, facilitating calculations. On Soviet divisions see *Soviet Military Power*, 1990 (Washington DC: USDOD, 1990), p. 78.

[20] CFE figures from IISS, *The Military Balance 1993-1994*, p. 252

[21] This column from IISS, *The Military Balance 1994-95*, pp. 107-115

[22] excludes 11,000 tanks "...in store east of Urals." Ibid. p. 112

[23] Neither have the Russians, for that matter.

[24] Julian Cooper suggests that 17.5% of Soviet defense workers and 13.7% of defense enterprises were to be found in Ukraine in the mid- 1980's. See Table 5 and 7 in "Reconversion Industrielle," *La Décomposition de l'Armée Soviétique*, Dossier No. 45 (Paris: FEDN, April 1992), pp. 151,153.

[25] Many Air Force people probably operate the large number of strategic air defense surface-to-air missiles inherited from the former Soviet Union. Moreover, for a country Ukraine's size, the air force's 174 IL 76s (large, long range, military transport aircraft) seems excessive.

[26] IISS, *Military Balance 1994-1995*, pp. 103-105.

[27] Other reserve based armies manage with shorter initial terms of service: Finland, eight months; Sweden, seven months; Switzerland, four months. Reservists are subject to periodic refresher training. See country entries, IISS, *Military Balance 1993-94*. If financial constraints should make it impossible to have an army of sufficient size to contain most eligible male citizens for 18 months, a much shorter term of service, supplemented by periods of refresher training, still could produce a sufficient number of trained men for the military structure outlined here.

[28] IISS, *Military Balance 1994-1995*, p. 104.

[29] Ukrainians made up roughly one-quarter of the Soviet officer corps. See Brian Taylor, "Red Army Blues: The future of military power in the former Soviet Union," *Breakthroughs*, vol. 2, no. 1, Spring 1992, pp. 1-8.

[30] John Mearsheimer, *Conventional Deterrence* (Ithaca: Cornell, 1983), pp. 50-52.

[31] Nothing would preclude holding a large operational reserve close to the Belarussian border to discourage Russian exploitation of that vulnerability, so that is not the most obvious failure mode.

[32] Allison, p. 40.

[33] A brief description is found in Adam Roberts, *Nations in Arms, The Theory and Practice of Territorial Defence*, 2nd ed. (New York: St. Martin's 1986), pp. 49-61. It should be stressed that during the Cold War the Swiss did intend to try to prevent the enemy from conquering any part of their territory; they intended to fight hard for the lowlands. See also Kurt Spillman, "Beyond Soldiers and Arms," pp. 169-170, in Joseph Kruzel and Michael H. Haltzel, eds., *Between the blocs* (Cambridge: Cambridge U. Press, 1989), and Laurent Carrel, "Switzerland," pp. 92-95, in Richard K. Bissell and Curt Gasteyger, *The Missing Link* (Durham: Duke U. Press, 1990).

[34] The Ukraine entry in, CIA, *The World Factbook 1994*, p. 411, reads "Inland waterways: 1.672 km perennially navigable (Pryp'yat' and Dnipro), suggesting that these two watercourses do not freeze.

[35] It is difficult to estimate Ukraine's ultimate capability to generate military power. Analogizing from the ratio of Russian economic and demographic indicators to those of Ukraine, roughly 3:1, vs military equipment holdings, roughly 5:1, it is plausible that Ukraine could financially afford to increase its stock of heavy weaponry somewhat, perhaps by 50%. Students of the current state of Ukraine's economy would probably find this notion preposterous, however.

[36] I do not know how many anti-tank guided missiles, medium mortars, "old fashioned" anti-tank weapons, or even small arms are currently present in Ukraine. While such weapons are relatively cheap, their acquisition might be difficult given Ukraine's current straightened economic circumstances.

[37] During World War II, US planners assumed that a US infantry division could hold about 15 km of front under average conditions. For brief periods during the Battle of the Bulge, veteran US divisions managed to hold almost 30 km, though at a huge cost. This notional Ukrainian infantry division is weaker in artillery, but stronger in infantry, medium mortars, and anti-tank weaponry. It has a small organic armor battalion, which US units lacked, though one was normally attached from higher echelons. This unit should be able to hold more ground than its WWII US counterpart, if the terrain provides some inherent defensive advantages, and if the defenses are well prepared. High resolution simulations could give us a better fix on how well this formation would do under the conditions specified. I have employed a rather schematic method based on weapons ranges, numbers, and rules of thumb to make this estimate. It is a reasonable first approximation. The divisional artillery, (122mm) if held 10 km back from the forward most troops, can still put a concentration directly in front of them anywhere along a 25 km front. Similar calculations were done for 82mm and 120mm mortars. Four infantry regiments can constitute two successive defensive zones at a not-unprecedented 4 km/battalion.

[38] In the mid-1980s a team of German military analysts performed a series of high-resolution simulations on 14 alternative designs for infantry and mechanized units to defend against Soviet ground attacks. These simulations pitted the notional units against a series of Soviet regimental attacks on the same 5km wide stretch of inter-German border. Their results suggest that a substantially higher density of major anti-armor weapons would be needed to stop a regimental sized mechanized attack than I have allocated. An infantry battalion based on a Swiss model, defending from well prepared positions, was able to stop the Soviet regiment when armed with 56 heavy recoilless weapons, and 24 man portable anti-tank guided weapons. This rich standard is obviously to be preferred. I suspect that it is unaffordable in the short term, but there is no reason why the Ukrainians should not build towards it. The division suggested here, would depend on its first defensive echelon to sort out the Russian main efforts so that the division's mechanized battalion could reinforce the most threatened infantry battalions of the second echelon, bringing weapons densities up to a point where they would have a good chance of foiling the Russian attack. Attack helicopters would also be of considerable assistance, though these scarce assets should be concentrated at higher command levels, not distributed in penny packets to the divisions. See Hans Hofmann, Reiner Huber, and Karl Steiger, "On Reactive Defense Options," in Huber, ed. *Modeling and Analysis of Conventional Defense in Europe-Assessment of Improvement Options* (New York: Plenum, 1986), pp. 97-139.

[39] This tactical concept is similar, though not identical, to those advanced by the more militarily conservative "defensive-defense" theorists of the 1980s. A brief, accessible introduction to a sophisticated "defensive defense" concept for the former West Germany can be found in John Grin and Lutz Unterseher, "The spiderweb defense," *Bulletin of the Atomic Scientists*, September 1988, vol. 44, no. 7, pp. 28-30; A critical and quite skeptical review of several concepts is David Gates, "Area defense concepts: the West German debate," vol. 29, no. 4, (July/August 1987) *Survival*, pp.301-317.

[40] It is difficult to guess how many major attacks a fifty division Russian force could generate along an 800 km Dnipro river front. Reasoning crudely from what was believed to have been Soviet practice, six, six-division breakthrough efforts seems plausible, each with three divisions in its first echelon and three in its second echelon or operational reserve. Each effort would occur on roughly 50 km of front, though their main efforts would occur on even smaller sectors. These efforts would be somewhat more demanding for the attacker than standard breakthroughs, because they would require a major river crossing operation. Against two defending Ukrainian infantry divisions of the kind outlined, the Russians would enjoy the kind of local numerical superiority that the Soviets seem to have wanted. A three division first echelon could muster some 1800 tanks, infantry fighting vehicles, and armored personnel carriers against two Ukrainian infantry divisions with some 400 heavy anti-tank weapons, tanks, and infantry fighting vehicles--a 4.5:1 ratio. In major artillery systems, the Russian first echelon alone would outgun the Ukrainians 600 guns to 100, 6:1., but much of the artillery from the Russian second echelon could also be brought to bear. In "maneuver battalions," tank, mechanized infantry, and foot infantry the ratio of the Russian first echelon to the Ukrainian infantry defense would be somewhat less favorable to the Russians -39:30, 1.25:1. But almost all the Russian units would be mechanized or armored and all but two of the Ukrainian battalions would be infantry. Unless the Ukrainians figure out where the Russian main efforts are, and move their armored forces there in timely fashion, Russian numerical superiority alone would ultimately break the Ukrainian defenses. Even if the Ukrainians do so, and commit the equivalent of two of their small armored divisions to defend against each of six breakthroughs, the local force ratios will still be quite favorable to the Russians, between 3:1 and 4:1 in heavy anti-tank weapons, tanks, infantry fighting vehicles, and artillery if both Russian echelons (6 divisions total) are measured against both Ukrainian echelons, (4 divisions total.) If one subscribes to the "3:1 rule of thumb" the Ukrainian defense is still a bit brittle. Only the high density of Ukrainian infantry, natural obstacles, and weeks or months of terrain preparation make this defensive system plausibly resilient. Degradation of Russian divisions arising from the initial phase of combat in the east, and from logistical problems precipitated by Ukrainian demolitions, also helped diminish the Russian edge somewhat. Nevertheless, if the Russians can make six breakthrough attempts, they only have to succeed in two or three to have a good chance to produce a generalized disaster for the Ukrainian defense. For this reason, it is vitally important that Ukraine not lose more than the equivalent of about a third of its 18 small mechanized divisions in the mobile battles in the east. A dozen armored divisions in reserve would give a Ukrainian commander sufficient flexibility to meet a number of simultaneous breakthrough efforts, with strong, though admittedly not confidently adequate forces. Attack helicopters would provide additional insurance. Ukraine's defense would also be greatly advantaged by intelligence on the location and timing of the Russian main efforts. Such intelligence would also help the Ukrainians decide whether and where to take risks on other parts of the front for the purpose of thinning the local defenses to provide still more assets to combat the large Russian breakthrough efforts. The reader patient enough to follow the preceding arithmetic will have observed that in the scenario presented some 14 odd uncommitted Russian heavy divisions are assumed to be able to fix some 38 Ukrainian motorized infantry divisions in their defensive positions merely by the potential offensive threat they pose. It seems plausible that the Ukrainians could free up some of these units to reinforce sectors heavily pressed by Russian main efforts. Indeed, this would likely prove essential.

[41] Barry R. Posen, ed., and the MIT Conventional Forces Working Group, *Breakthroughs* (forthcoming); see also US Army, *German Defense Tactics against Russian Breakthroughs*, facsimile edition, (Washington DC: Center of Military History, 1988).

[42] I have tried to grapple with this question in a historical context in "Nationalism, the Mass Army, and Military Power," Vol. 18, No. 2 (Fall 1993) pp. 80-124.

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